

NESTING BEHAVIOR OF *TRICHOGORYTES*  
*COCKERELLI* (ASHMEAD)  
(HYMENOPTERA, SPHECIDAE, NYSSONINAE)<sup>1, 2</sup>

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ABSTRACT: Notes are presented on the behavior of *Trichogorytes cockerelli* (Ashmead) in an area of sand dunes 20 miles north of Socorro, N. Mex. Digging behavior is described in detail. The nests are from 23 to 28 cm deep and are provisioned with paralyzed leafhoppers of several species.

DESCRIPTORS: Sphecidae; *Trichogorytes cockerelli*; nesting behavior.

*Trichogorytes* is a poorly known genus containing only two species, both confined to the southwestern United States. Neither species has been often collected, and nothing has been reported regarding the prey or nesting behavior. During June, 1975, I found *T. cockerelli* (Ashmead) to be reasonably common in sand dunes bordering the Rio Grande Valley at the LaJoya Waterfowl Preserve, 20 miles north of Socorro, New Mexico. Specimens were taken in a Malaise trap set up in the dunes, and paralyzed males and females were taken from nests of *Philanthus psyche* Dunning, which nested close beside *T. cockerelli*. Four *Trichogorytes* nests were found, and two of these were excavated. Females were compared with the type of *T. cockerelli* (from Mesilla Park, N. Mex.) in the U.S. National Museum, and found to resemble it very closely.

All four nests were in gently sloping, fine-grained sand in parts of the dunes where there were sparse herbs and bushes and relatively little moving sand. The nests were widely spread, in fact 3-10 m apart, and interspersed with nests of sand-nesting wasps of

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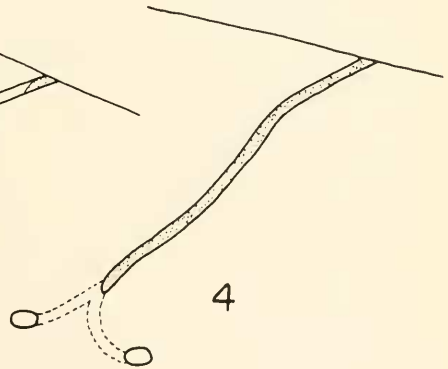
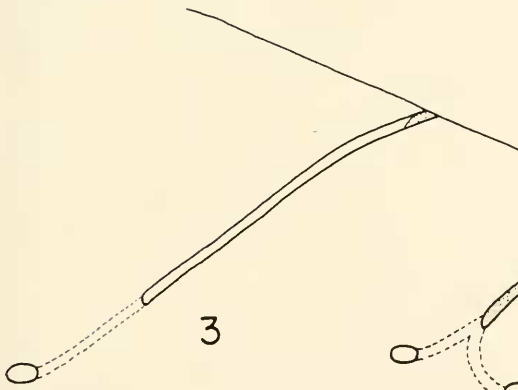
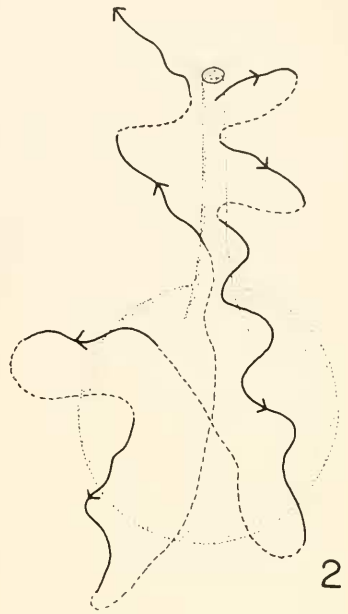
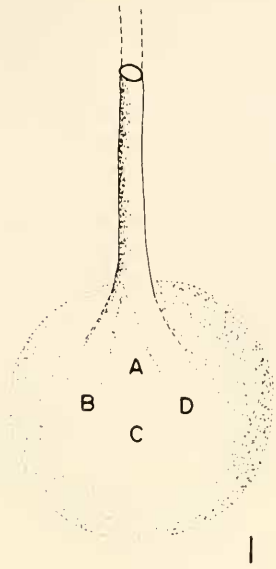
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such genera as *Bembix*, *Philanthus*, *Ammophila*, and *Plenoculus*. In general, there proved to be nothing unexpected about the nests and prey of *T. cockerelli* (as compared to related genera such as *Gorytes* and *Hapalomellinus*; see Cazier and Mortenson, 1965, Evans, 1966.) However, the digging behavior was unusual and is here described in some detail.

The first female was observed in an early stage of nest construction at 0900 on 27 June (my note no. 2455). The appearance of the nest was striking, since there was a pronounced groove leading from the entrance to a nearly circular mound of sand, well removed from the hole (Fig. 1). The groove was 4 cm long, about 0.5 cm wide and 0.5 cm deep; it led to a mound measuring 3 x 3 cm and about 0.3 cm deep in the center. The wasp invariably emerged from the burrow head first, walked the length of the groove, then turned around and retraced her steps to and into the burrow while scraping sand behind her. Since she turned around each time at one of several different points on the mound, the sand tended to be spread in a circular pattern. As the wasp walked out the groove, she moved her abdomen up and down 3-5 times; then after she turned around and began moving toward the hole scraping sand, she moved her abdomen up and down much more rapidly, synchronously with the spurts of sand that passed beneath the body. At no time was the wasp seen to take flight. All movements seemed very mechanical, and I found it possible to watch and to photograph the behavior closely without

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Figures 1-4, nests of *Trichogorytes cockerelli* (Ashmead). Fig. 1, External appearance of nest in process of being dug; A-D, points at which female stopped when emerging from nest (see text). Fig. 2, Same nest, diagrammatic representation of some of movements of closure and leveling; heavy black lines indicate movements while scraping sand, dashed lines, walking while not scraping. Fig. 3, lateral view of nest, note no. 2455. Fig. 4, lateral view of nest, note no. 2461; stippled portions filled, dashed lines parts of burrow that could not be traced.



disturbing her. The following is an account of her movements over a 9 minute period.

0908:00 wohf to A, tste, re-entered at 0908:25<sup>4</sup>  
0908:45 wohf to B, tste, re-entered at 0909:05  
0909:30 wohf to D, tste, re-entered at 0910:02  
0910:30 wohf to C, tste, re-entered at 0910:45  
0911:15 wohf to D, tste, re-entered at 0911:30  
0911:56 wohf to D, tste, re-entered at 0912:25  
0912:50 wohf to B, tste, re-entered at 0913:10  
0913:30 wohf to D, tste, re-entered at 0913:50  
0914:14 wohf to D, tste, re-entered at 0914:30  
0915:05 wohf to D, tste, re-entered at 0915:20  
0916:05 wohf to B, tste, re-entered at 0916:25  
0916:50 wohf to D, tste, re-entered at 0917:10

- 4 wohf = walking out head-forward;  
tste = turning around and scraping while moving toward entrance.

Thus the wasp each time spent 15-32 seconds ( $\bar{x} = 21$ ) outside the nest, a slightly greater amount of time inside the nest (20-45 seconds,  $\bar{x} = 27.5$ ). I rechecked this nest at 0935 and found the female engaged in identical behavior except that the periods inside the nest had lengthened to an average of about a minute.

At 0938 this behavior ceased abruptly and was replaced by a series of movements serving to close the entrance and flatten the groove and mound (Fig. 2). In this instance the wasp proceeded away from the entrance or groove scraping sand behind her, to a distance of up to 10 cm, then turned around and walked toward the entrance or groove without scraping sand; at some point near the center she then turned around again and proceeded away. Movements away from the entrance or groove were often very irregular, somewhat zigzag, and were accompanied by rapid up and down movements of the abdomen. This behavior ceased after 7 minutes, when the wasp flew off, leaving the next entrance flat and well concealed, the entrance well filled.

Two days later, at another nest 10 m away, both digging and leveling behavior were again observed in some detail, at about the same time in the morning and following an identical pattern. The typical groove and mound were observed at still a third nest. At the fourth nest, the surface had already been leveled and the female was provisioning when first discovered (note no. 2461). The leafhopper prey was carried in the usual manner of wasps of this group, that is, the wasp grasped it with her middle legs and allowed it to dangle slightly beneath the abdomen. As she landed at the covered nest entrance she scraped it open with her front legs and pulled in the prey behind her with her hind legs.

The two burrows excavated both passed into the slope at about a 60 degree angle with the surface. I excavated one nest in the late afternoon (1800 hours) and found the female in the burrow at a vertical depth of 21 cm. A single fully provisioned cell was found beyond her at a depth of 28 cm (no. 2455; Fig. 3). The second nest was excavated after it had received a final closure (no. 2461; Fig. 4). The burrow had been completely filled with sand although it could be traced to a depth of about 22 cm. Two cells were found, about 3 cm apart, at depths of 23 and 24 cm, both about 40 cm from the entrance.

The three cells found were filled with paralyzed leafhoppers, venter-up and head-in, numbering 8 to 10 per cell. All but one were adults, and belonged to three species: *Exitianus exitiosus* (Uhler), *Circulifer tenellus* (Baker), and *Norvellina* sp. [det. J.P. Kramer]. In one cell I found a newly hatched wasp larva lying longitudinally along the venter of a leafhopper. Evidently the egg is laid in this position, as is common in related genera such as *Gorytes* (Evans, 1966, Fig. 39).

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